

Study guide for chapter 9: Cellular Pathways that Harvest Chemical Energy

NB! This should be considered a guide to the aspects of the chapter which are most important and those which have lower priority. However, exam questions within the areas not specifically highlighted are not excluded.

Most important:

- Understand the difference between anaerobic and aerobic processes
- Understand the difference between reduction and oxidation reactions (p170)
- Be able to recognise the structure of NAD^+/NADH (Fig 9.3) and know the function of the two electron carriers NAD and FAD
- Have an overview of the metabolic pathways required for breakdown of glucose (Fig 9.4) and know their subcellular localization in eukaryotes and prokaryotes (Table 9.1)
- Know the inputs and outputs (products) for each of the described pathways involved in aerobic and anaerobic breakdown of glucose. It is not necessary to be able to describe each reaction of the pathways but key metabolites (molecules) should be recognized.
- Enzymes with highlighted functions in regulation of the metabolic pathways should be known
- Intermediates (metabolites) that link the pathways to synthesis or breakdown of fatty acids (triglycerides), amino acids (proteins), polysaccharides and nucleic acids should be known (Fig 9.14)
- Understand how energy is released by the electron transport chain (Fig 9.8 and 9.9)
- Be able to explain the chemiosmotic mechanism for ATP synthesis, including the experiments used to document it (Fig 9.10)
- Explain what fermentation is, and its importance for regeneration of NAD^+
- Explain the basis for the difference in energy released by aerobic and anaerobic metabolism